

AFFINITY™ F-SERIES CHILLER



User Manual D2395

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Introduction



Congratulations on your purchase of an Affinity™ product.

I want to personally welcome you to the Lydall larger family. In October of 2001, Lydall purchased Affinity Industries, in an effort to expand capability as a Total Thermal Solutions Provider. Affinity's chillers and heat exchangers complement Lydall's existing wide array of Passive Thermal Solutions, augmenting Lydall's engineered thermal solutions for use in appliance, cryogenic, building products, and automotive markets. Our group is market driven as a formidable thermal solution manufacturer.

Lydall, Inc. is a New York Stock Exchange listed company (NYSE: LDL) headquartered in Manchester, CT. Our company, with ten operations in the United States, France, one in Germany, and Sales/Service Offices in Japan and Singapore, is recognized for working with customers to satisfy their unique thermal solution needs, and for delivering high quality, innovative products, and exceptional service.

Affinity™ products are high-precision specialty temperature-controlled equipment. The following product manual is designed to help you realize the full value of your purchase.

We highly recommend that you read this manual in its entirety. The manual will assist your company with the installation, operation, and routine maintenance of your Affinity™ product. Please keep this manual readily accessible to operation and service personnel to ensure you get the most out of our product.

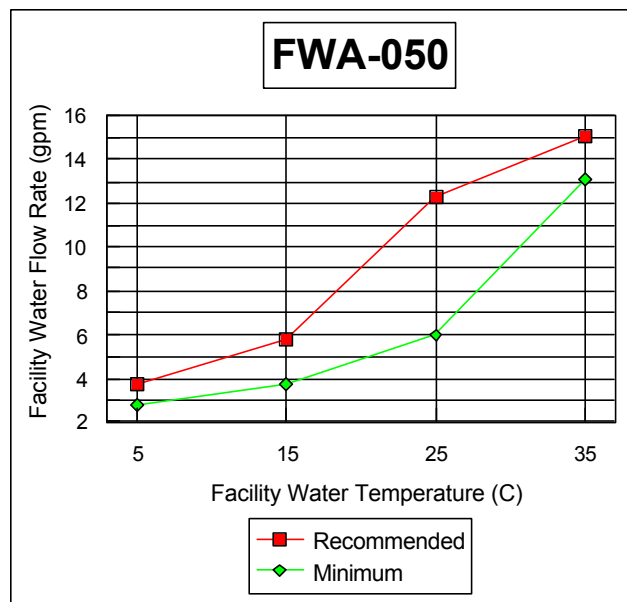
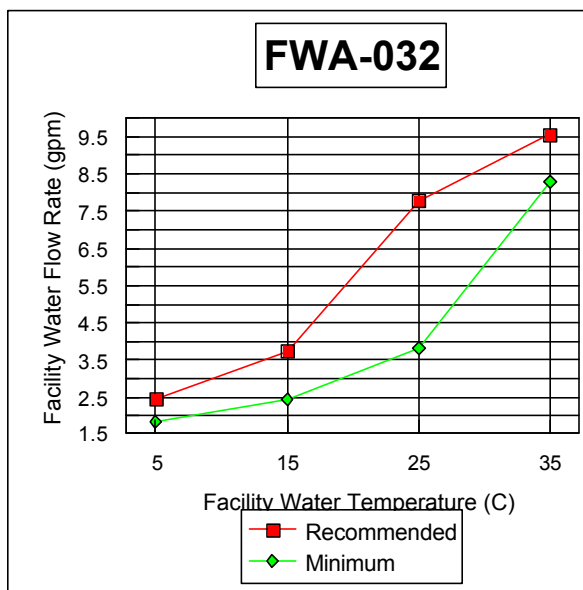
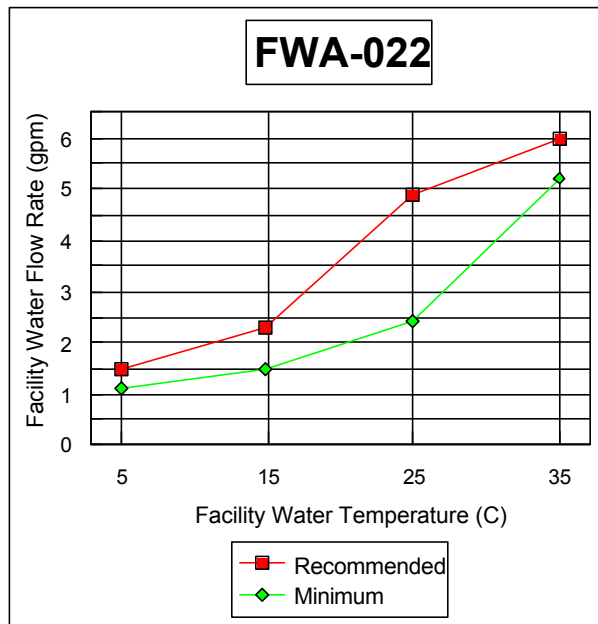
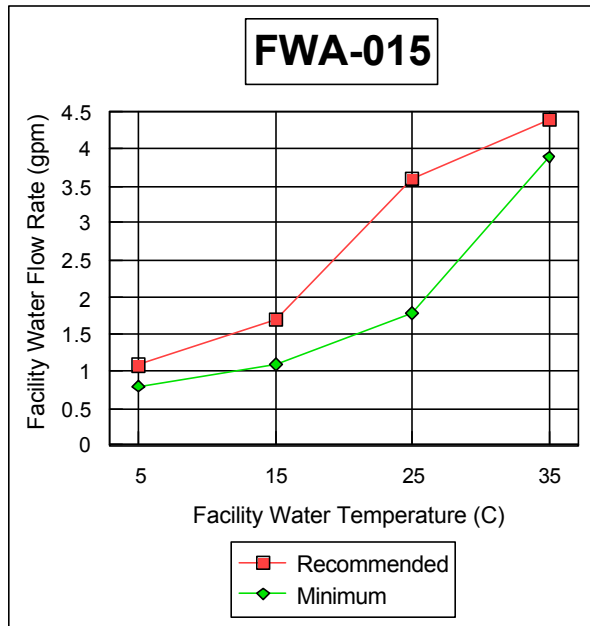
If you have any questions about this model, or have other thermal solution needs, do not hesitate to call our Sales department (603-539-3600) or the 24/7 Service department (603-539-5005).

Thank you for your confidence in our ability to meet and/or exceed your needs and expectations.

Sincerely,

John Tattersall
Group Vice President
Lydall Industrial Thermal Solutions, Inc.

Facility Water Requirements



The model number on the serial tag will indicate which graph references this unit.

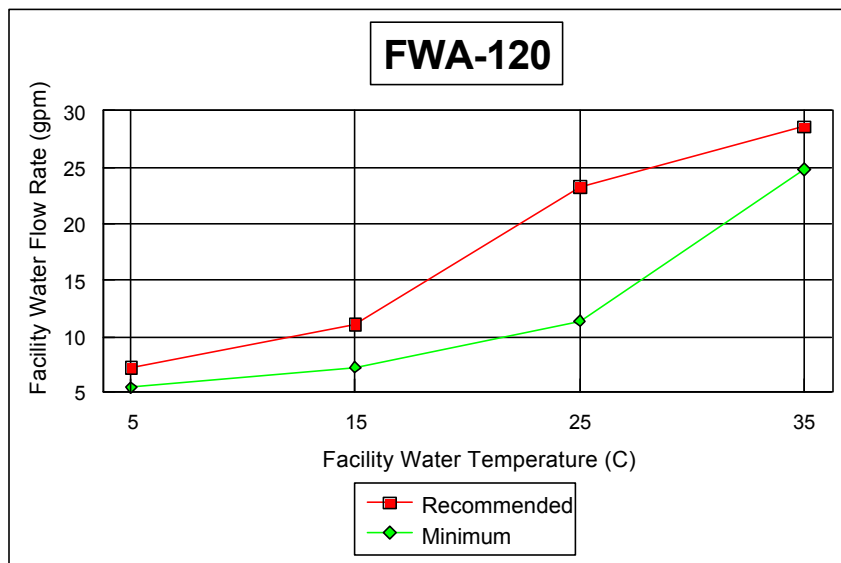
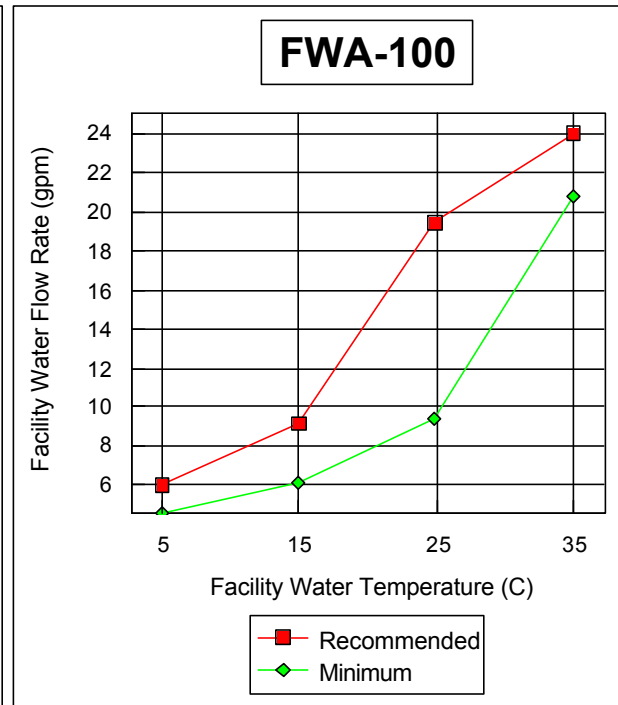
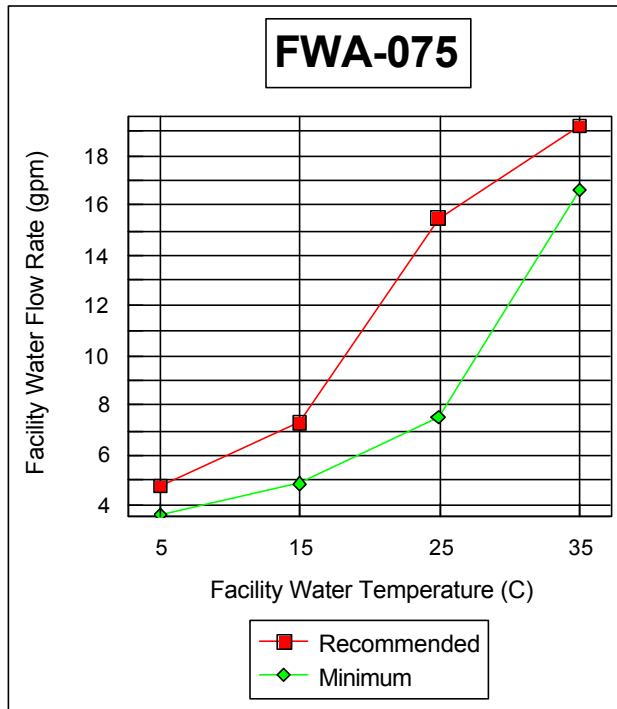
20psi Minimum Facility Water Pressure Differential

50psi Maximum Facility Water Pressure Differential

75psi Maximum Facility Water Inlet Pressure

Operating with Minimum Facility Water Flow reduces system efficiency.

Facility Water Requirements



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20psi Minimum Facility Water Pressure Differential

50psi Maximum Facility Water Pressure Differential

75psi Maximum Facility Water Inlet Pressure

Operating with Minimum Facility Water Flow reduces system efficiency.

Equipment Precautions

Failure to adhere to these precautions will void the warranty and may damage the chiller.

1. This chiller has been shipped without coolant. Do not run it without connecting the coolant lines and keeping them filled with the appropriate coolant. Never run the pump without prime because it will be quickly ruined without liquid.
2. Never use coolants which are incompatible with the components in the chiller's coolant loop. Some coolants may not damage the coolant loop components, but may significantly derate the chiller's coolant capacity. **Never use automotive antifreeze or other antifreeze containing silicates because this will cause the pump seals to fail.** Check with Lydall if there are questions about the coolant.
3. Maximum storage temperature for the unit is 52°C (125°F).
4. Heat generated by motors and electrical components must be dissipated. Allow sufficient clearance around the unit to dissipate this heat.
5. This chiller is designed for indoor use only. Do not operate the chiller in ambient temperatures below 7°C (45°F) or above 40°C (104°F). If the chiller has been exposed to temperatures below 7°C, allow 24 hours at ambient temperatures above 7°C to warm the oil in the compressor as well as the refrigerant before starting.
6. If this unit contains refrigerant, there is an oxygen depletion risk that should be considered. It must be placed in a room with adequate volume based on the amount of refrigerant in the unit. If additional refrigeration equipment is in the room, additional space must be provided. In the **Placement** section, under **Installation**, refer to the **Warning: Oxygen Depletion Risk** for more details.
7. The chiller is powered by three phase electricity; verify pump rotation before operating. Rotation should be in the same direction as the arrow on the pump casing. Only qualified electrical service technicians should switch legs on three phase power to change pump rotation. The compressor is not sensitive to phase. Pump rotation must be verified when the chiller is connected to a different circuit.
8. Routinely inspect the pump inlet strainer located in the reservoir for debris. Turn off the chiller, then remove and clean the strainer as needed to permit free flow of coolant. Keep foreign debris from entering the coolant line while the strainer is removed. Hint: A plastic sandwich bag may be used to wrap the strainer to contain most of the debris. Failure to keep the strainer clean will reduce the flow of coolant and damage the pump.
9. Regularly clean the screen in the assembly at the chiller's inlet for Facility Water. To clean, turn off the chiller, shut off the supply of Facility Water to the chiller, and remove the screen. Clean the strainer as needed, then reinstall.

Equipment Precautions

10. This chiller exhausts the heat it extracts to Facility Water. The Facility Water should never exceed 30°C (86°F). The Facility Water flow will be controlled by the water valve at Lydall's condenser. See the section on Facility Water Requirements for the exact flow, pressure and temperature required for this unit.
11. A water-cooled unit must never be operating without the Facility Water connected and flowing at the specified rate indicated in the Facility Water Requirements section. The unit will be damaged in a very short time period if operated without Facility Water.
12. Do not operate the chiller at coolant temperatures above or below the values it was specified to deliver.
13. Do not run the chiller with cooling loads that exceed its factory rated cooling capacity.
14. Do not operate damaged or leaking equipment.
15. The chiller must not be transported unless suitably protected. Original factory packaging in good condition or equivalent is required. Request air-ride trucks when transporting over land.
16. The chiller should be thoroughly drained and the coolant lines blown dry with low pressure compressed air before shipping or storing.
17. Modifying the chiller without express written consent from Lydall will void the warranty.

Safety Precautions

1. Heed all warning labels. Do not remove.
2. Do not operate the chiller with the bonnet removed. The bonnet protects personnel from rotating parts and hot surfaces and also protects the chiller's components.
3. Connect the chiller to a properly fused disconnect box in compliance with the National Electric Code (NFPA-70) as well as state and local codes for American usage, or local and national codes for European usage. Maximum fuses must not exceed the maximum rating found on the serial tag on the electrical box. The voltage, phase, and frequency of the power source must also match the requirements specified on the serial tag. **To reduce the risk of electric shock:**
 - Disconnect electrical power before opening the electrical box, except for the checking of the phase reverse relay or phase monitor if included with this unit (phase reverse relays or phase monitors will never be included in single phase units). Power must be applied in order for the phase reverse relay or phase monitor to indicate phase sequence.
 - Do not operate with electrical box door open.
 - Refer servicing of electrical box components to qualified/certified personnel.
 - Do not operate equipment with damaged electrical power cords.
 - Turn off the unit and disconnect electrical power before servicing or moving.
 - Properly ground the unit.
4. Coolant lines, filters, and other components which connect to the chiller must be capable of withstanding the maximum pressure that the pump in the chiller can deliver at the maximum expected temperature.
5. The coolant loop has not been designed for potable water applications. Do not use the chiller for potable water. Never hook the water lines of a water-cooled unit to a potable water source or immerse a hose connected to a potable water source in the reservoir without providing back flow protection. A loss of pressure in the water source could lead to a back flow of the fluid in the unit, resulting in a possible contamination of the potable water source.
6. Vapors of some alcohol based antifreezes as well as other coolants may cause explosion if exposed to flame or spark.
7. Certain antifreezes may be poisonous if ingested.

Installation

Transporting

An Affinity™ chiller rolls easily on its four swivel casters. The brakes must be off on the two locking casters when moving the unit. Roll the chiller gently to its operating location. The cushioned casters will help to dampen shock. Lock the casters when the chiller is in place. If the chiller is carried with a forklift, proceed slowly and carefully to avoid jarring the chiller. Insert the forks the longer dimension to catch both of the reinforcing rails of the chassis, taking care to prevent damage to the casters.

If the chiller will be shipped, protect it from shock and vibration or the warranty will be void. The chiller must not be transported unless suitably protected. Original factory packaging in good condition or equivalent is required. Request air-ride trucks when transporting over land.

Drain all coolant lines and blow them dry with low pressure air before transporting or storing the unit. Lydall will not accept any unit containing measurable amounts of fluid. Fluid left in the unit during shipping may damage components within the unit. Such damage is not covered by warranty.

Placement

Select a level location near the application, free from dripping or spraying moisture and excessive dust. Keep the coolant lines short to allow the pump to provide maximum pressure and flow to the application. If the chiller will be placed more than 25 feet from the application, call Lydall to discuss placement and how it might affect performance.

Units with non-pressurized reservoirs should never be installed more than 25 feet below the process or overflow may occur. Distances may vary slightly due to elevations above sea level. Call Lydall service (603-539-5005) for more information.

WARNING: Oxygen Depletion Risk

In the event of a refrigerant leak, refrigerant gas may displace oxygen that could result in suffocation and death. Never place the chiller in a room that is smaller than the minimum room volume requirement as defined below. If the room is ventilated, the air distribution system must be analyzed to determine the worst case distribution of leaked refrigerant. A leak detector alarm device is always required in a ventilated room that does not meet the minimum room volume given below. Assure adequate and sufficient room volume and ventilation before placing a chiller that contains refrigerant in a room. Contact Lydall at 1-603-539-5005 if you have any concerns or questions.

Pounds of refrigerant charge can be read directly from the nameplate on your chiller. Remember to include in your calculation any refrigerant that may be stored in any other containers.

Minimum Room Volume = Pounds of refrigerant x 110 cubic feet

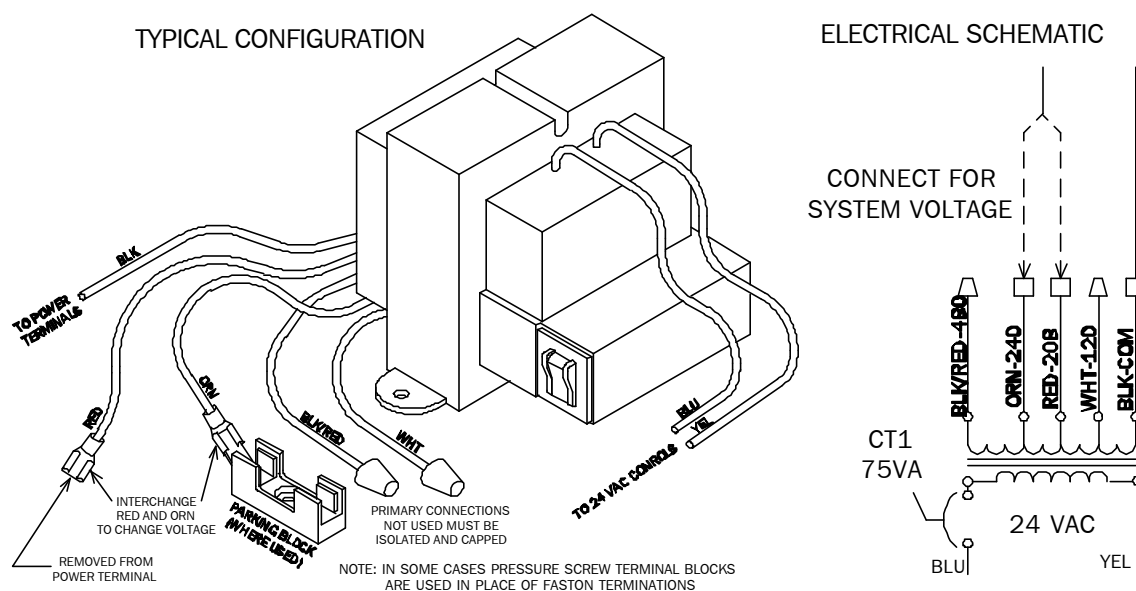
Example: Two chillers are placed in a room, each containing 6 pounds of refrigerant. The minimum room volume shall be 12 x 110 cubic feet, or 1,320 cubic feet.

Installation

Electrical Requirements

Connect the chiller to a properly fused disconnect box in compliance with the National Electric Code (NFPA-70) as well as state and local codes for American usage, or national and local codes for European usage. Maximum fuse sizes in the disconnect box must not exceed the maximum ratings specified on the serial tag of the chiller (found on the electrical box near where the power cord connects). The voltage, phase, and frequency of the power source must also match the requirements specified on the serial tag.

Note: Affinity™ models that can operate at 208-230 Volts 60 Hertz have been set at the factory for 208-230 volt operation. If the operating voltage will be greater than 220 volts, a qualified electrician should remove the red wire from the contactor and replace it with the orange wire taken from the dummy fuse block. Attach the red wire to the dummy fuse block as shown in the diagram below. All voltages may not be compatible with this unit. See the unit's serial tag for the correct voltage range.



Warning: To reduce the risk of electric shock, do NOT remove cover from the electrical box. It contains exposed high voltage wires. Refer servicing to qualified personnel. Disconnect power to the chiller before servicing.

Installing the External Strainer Accessory

The strainer accessory comes with extra fittings to allow arrangement in different configurations. Any combinations of these fittings is acceptable. Lydall recommends that the strainer be installed on the Facility Water inlet port.

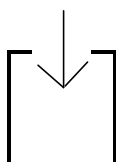
Installation

The strainer requires a regular maintenance schedule. Frequency will be based on the application and the cleanliness of the fluid, which can vary greatly. Failure to regularly check the strainer may result in poor performance and/or unit failure.

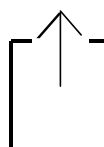
Priming the Pump and Connecting the Coolant Loop

DO NOT RUN THE PUMP DRY. If the pump does not establish prime, the pump shaft seal may overheat and be damaged in less than a minute. Use the following instructions when filling and assembling the coolant lines to prevent damage to the pump shaft seal.

1. Close the reservoir drain.
2. Fully open the flow control valve (if included).
3. Have extra coolant to add as the pump primes and the coolant loop fills.
4. Fill the reservoir with coolant. Do not fill above the height of the coolant loop connection fittings or fluid may leak out.
5. Connect the coolant lines from the application to the FPT (female pipe thread) fittings near the top of the chiller as follows. Do not over tighten the insert and do not use a sealant that will lock the male threads to the female threads.
 - a. Connect the coolant line coming back from the application to the RETURN fitting.
 - b. Connect the coolant line going to the application to the SUPPLY fitting.



RETURN



SUPPLY

6. Check for proper pump rotation by “bump” starting the chiller. Bump start by placing the ON/OFF/SET switch in the ON position for one or two seconds. Pump rotation should be in the same direction as the arrow on the pump. If the direction of rotation is incorrect, a qualified electrical technician should exchange any two of the wires in the incoming power source (DO NOT change any wiring inside the chiller). Check again for proper pump rotation as above.
7. When the previous steps are complete, turn the chiller on by placing the ON/OFF/SET switch in the ON position. Immediately check for flow. If within five seconds no turbulence is visible in the reservoir or the supply pressure gauge shows no pressure reading, shut the chiller off by placing the ON/OFF/SET switch in the OFF position. If flow is established, continue filling until the reservoir level rises to within a few inches of the top. Do not allow the reservoir to overflow.

Installation

8. If the pump does not establish prime, disconnect the SUPPLY coolant line to vent any trapped air, reconnect the line, and repeat step 7.
9. If the pump still does not prime, use the following steps:
 - a. Disconnect both coolant lines (have a container handy to catch any overflow from the RETURN fitting).
 - b. Force coolant into the SUPPLY fitting. The fluid will force the air out of the lines in the chiller and out of the pump head, causing it to escape into the reservoir. If tap water will be the source of coolant, simply connect the tap water line to the SUPPLY fitting and turn on the tap. If a source of coolant other than tap water will be used, elevate the coolant a few feet above the chiller, connect to the SUPPLY fitting, and let gravity force the air out into the reservoir. Remember to have a container handy to catch any overflow from the RETURN fitting.
 - c. Reconnect the coolant lines and repeat step 7. Stop filling when the reservoir is full to within a few inches of the top. Do not allow the reservoir to overflow.

A stainless steel mesh strainer attaches to the pump suction port near the bottom of the reservoir. It can easily be removed for cleaning. First turn the pump off, then pull off the strainer, rinse it clean, and push it back on. To protect the pump, routinely inspect the strainer to be sure it is clean and properly attached. Hint: If the strainer is coated with debris, wrap it with a plastic sandwich bag before pulling it off to prevent most of the debris from escaping into the reservoir.

Cooling a Water-Cooled Condenser

Never hook the cooling lines of a water-cooled unit to a potable water supply without providing back flow protection. A drop in pressure in the water supply could cause back flow, resulting in the possible contamination of the potable water supply.

Water-cooled chillers require Facility Water to cool the condenser during operation. The amount of flow is controlled automatically by a valve Lydall installs on the condenser. See the Facility Water Requirements section of this manual for the specific flow, temperature and pressure needed for this unit. Failure to connect Facility Water to the unit and supply the correct amount of flow may severely damage the unit in an extremely short period of time.

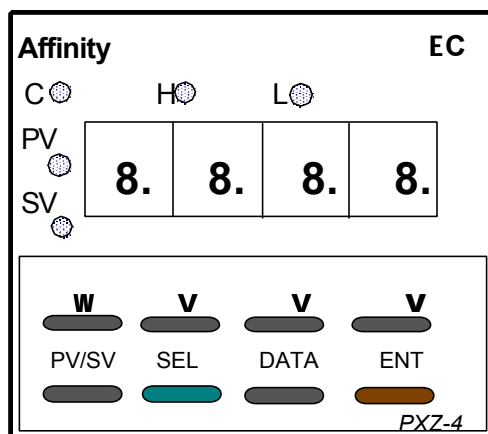
Connect the Facility Water supply to the "WATER IN" fitting at the bottom of the chiller. Connect the Facility Water return to the "WATER OUT" fitting. Use connecting lines of the size indicated on the coolant diagram (inside diameter) to reduce pressure loss. Install the external strainer accessory as previously instructed.

Note: The coolant lines of all water-cooled chillers have been blown dry with low pressure air before shipping to protect the units from freezing and subsequent damage. This may cause the condenser to be dry which, in turn, could result in failure to start upon initial start-up (there could be no water in the condenser to absorb the heat). This is easily corrected by pressing the high pressure reset switch a few times to initiate flow through the Facility Water side of the chiller.

Operation

Using the Controller

This Affinity™ chiller comes standard with a FUJI 1/16 DIN temperature controller. This controller is a programmable microprocessor, which offers many more features than are necessary to master at this point. If more than the basic instructions provided in this manual will be needed, call Lydall service (603-539-5005) for technical assistance or consult the FUJI Instruction Manual.



Place the ON/OFF/SET switch on the control box (if included with this chiller) or the chiller's control panel near the Fuji controller in the SET position. SET activates the control display but does not turn on the refrigeration and pump systems of the chiller. Four dots will appear on the display, then in 3-4 seconds the temperature of the coolant will appear plus an indicator light next to PV. Indicator lights next to C, H, or L may also appear. The function of these lights will be discussed later in the section on **Safety Alarms**.

Press PV/SV until the indicator light appears next to SV to display the Set-Value temperature. The Set-Value temperature can be changed to any temperature within the range programmed for this Affinity™ model. Note: Pressing PV/SV allows toggling the indicator light between PV, the actual process coolant temperature, and SV, the Set-Value temperature.

Changing the Set-Value Temperature

Change the Set-Value temperature by pressing PV/SV until the indicator light appears next to SV. Then directly under the digit in the display to be changed, press (^) and the digit will start blinking. To increase the digit value, press (^) under the blinking digit as many times as necessary. To decrease the digit value, press (v) at the left side of the controller. Press (^) under the next digit value to be changed and repeat the process. When all the digits are set to the desired value and with one digit still blinking, press the red (ENT) key at the far right of the controller to enter the new Set-Value temperature.

Operation

A display of letters or numbers which do not indicate temperature may appear. SEL or DATA was probably inadvertently depressed. The FUJI Instruction Manual explains the use of SEL and DATA functions which are used solely in setting the basic program of the microprocessor. Press PV/SV to return to either the PV or SV display.

The controller comes pre-programmed according to the Affinity™ model selected. If the additional features programmed into the controller will be needed, consult the FUJI Instruction Manual, or call Lydall service for technical assistance. The highest and lowest SV programmed into the controller depends upon the model selected.

Caution: Never program in a Set-Value temperature of more than 32EC (90EF) unless this Affinity™ model is specially modified to operate at higher coolant temperatures. Never program in a Set-Value temperature of less than 5EC (40EF) unless a suitable antifreeze is used as coolant, **AND** the chiller is designed to operate at below freezing temperatures.

Turn the whole system on by placing the ON/OFF/SET switch in the ON position. The Set-Value temperature can be changed with the switch in either the ON or SET position.

Air bubbles will be visible rising in the reservoir as the pump forces air out of the coolant loop. After the air has been purged from the coolant loop, a steady turbulence may be seen in the reservoir. This turbulence mixes the coolant to deliver more precise temperature stability in the coolant supply than the controller indicates.

Safety Alarms

The LOW LEVEL indicator light and the corresponding audible alarm actuate when the coolant level in the reservoir is low and needs to be replenished. This indicator light does not actuate with the ON/OFF/SET switch in the SET position.

The FAULT light comes on if too little coolant is circulating through the heat exchanger. The FAULT light comes on momentarily upon start-up until the pump establishes sufficient flow. The FAULT indicator does not actuate with the ON/OFF/SET switch in the SET position.

If the FAULT light remains on for more than a few seconds, the chiller should be turned off and the reason for loss of circulation determined and corrected.

Caution: Although the FAULT light alerts the operator that no coolant is flowing, the operator must not assume proper circulation through equipment external to the chiller if the light does not appear. A bypass system built into the chiller to protect the pump may satisfy circulation requirements within the chiller even though flow outside the chiller is blocked. For example, turning the flow control valve on the chiller to no external flow does not actuate the light; similarly, a wheel of a forklift truck standing on an external cooling line, thus stopping the flow to the application, will not actuate the fault light.

Operation

The FUJI controller on this chiller has HIGH and LOW TEMPERATURE ALARM LIGHTS: H and L appear just under the Affinity™ logo at the top of the controller. At the factory, a technician has programmed the alarm light to come on under H if the circulating coolant is above the temperature that this chiller has been set to deliver. The alarm light under L is programmed to come on if the circulating coolant is below the temperature the chiller has been set to deliver. Consult the factory if it is necessary to operate above or below these limits.

The light on the FUJI controller next to C, when lit, indicates that the refrigerant solenoid valve is open to allow refrigerant to flow to the heat exchanger. If the light is on most of the time, most of the capacity of the chiller is in use. If the light is on infrequently, much less than the full capacity of the chiller is being used.

Preventive Maintenance

A stainless steel mesh strainer attaches to the pump suction port near the bottom of the reservoir. It can easily be removed for cleaning. First turn the pump off, then pull off the strainer, rinse it clean, and push it back on. To protect the pump, routinely inspect the strainer to be sure it is clean and properly attached. Hint: If the strainer is coated with debris, wrap it with a plastic sandwich bag before pulling it off to prevent most of the debris from escaping into the reservoir. The frequency of checking and cleaning this strainer will depend on the cleanliness of the process and the fluid.

The Facility Water strainer requires a regular maintenance schedule. Frequency will be based on the application and the cleanliness of the fluid, which can vary greatly. Failure to regularly check the strainer may result in poor performance and/or unit failure.

Check the strainers a week or two after starting the unit, then develop your own schedule for checking and cleaning the strainers based on experience.

Decommissioning

Decontamination procedures are not required or applicable as there are no hazardous materials used within this unit. The refrigerant used in this unit is environmentally friendly (a non-ozone depleting HFC) and poses no hazard to the environment. However, the refrigerant must be recovered by a qualified refrigeration service technician in accordance with all applicable laws. When decommissioning, remove all fluids by opening all drains and placing the fluid in appropriate containers. After all flow has ceased, purge the lines with low pressure air.

The unit is comprised of metals that may be recycled. The significant metals which make up the unit are as follows:

- , Cold-rolled steel
- , Stainless steel
- , Copper

There are no significant amounts of plastics or other materials incorporated into this unit. Recycle metals appropriately.

Trouble Shooting Guide

Problem	Possible Cause	Possible Remedy
Unit does not start	No power to unit, breaker tripped	Verify correct power is applied, close breaker after correcting fault
	Low voltage	Check electrical service to unit
	Refrigeration high pressure cut-out tripped	Manually reset button on pressure switch after correcting fault
	Loose wire	Disconnect power, then check wiring
	Defective contactor or coil	Repair or replace contactor or coil
	Loss of refrigerant	Locate and repair leak, then recharge with type and amount of refrigerant specified on serial tag
	Compressor damaged	Replace compressor - Call Lydall
Unit does not cool	Compressor internal thermostat tripped	Allow time for compressor to cool and automatically reset
	Compressor damaged	Replace compressor - Call Lydall
	Evaporator damaged	Call Lydall
	Microprocessor failure	Replace microprocessor
	Facility Water control valve set too low	Reset Facility Water control valve - Call Lydall
	Microprocessor programmed incorrectly	Reprogram microprocessor - Call Lydall
	Insufficient flow of Facility Water	Increase flow of Facility Water
	Facility Water too warm	Provide cooler Facility Water
	Cooling load exceeds capacity of unit	Reduce cooling load
	Refrigeration solenoid coil failure	Replace solenoid coil

Problem	Possible Cause	Possible Remedy
Unit does not cool (continued)	Loss of refrigerant	Locate and repair leak, then recharge with type and amount of refrigerant specified on serial tag
	Solid State Relay failure	Replace Solid State Relay
	Solenoid valve stuck shut	Repair or replace solenoid valve
	Defective refrigeration low pressure cut-out	Repair or replace low pressure cut-out
	Malfunctioning thermal expansion valve	Replace thermal expansion valve
	Pump damaged, loss of flow	Replace pump
	Hot gas bypass valve setting too high	Call Lydall
	Hot gas bypass valve stuck open	Repair or replace valve
Pump leaks	Faulty pump casing	Replace pump assembly
	Shaft seal damaged	Replace shaft seal
	Pump housing O-Ring damaged	Remove pump and rebuild
	Improper fluid	Call Lydall
Excessive noise on Start-Up	Low voltage	Check electrical service to unit
	Wrong voltage taps used on transformer	Connect to proper taps
	Contact or coil failure	Replace contactor or coil
Pump motor overheats	Pump overload protection set too high	Reset pump thermal overload relay, or replace if faulty
	Improper voltage supplied	Correct voltage

Problem	Possible Cause	Possible Remedy
Noisy compressor	<p>Flooding of refrigerant into crankcase</p> <p>Worn compressor</p> <p>Refrigeration high pressure cut-out set too high</p> <p>Refrigeration low pressure cut-out set too low</p>	<p>Warm crankcase if unit has been off for a long period or has been left in a cool ambient for more than a few hours</p> <p>Replace compressor - Call Lydall</p> <p>Adjust setting</p> <p>Adjust setting</p>
Level light remains on	<p>Low coolant level</p> <p>Reservoir level switch float stuck</p> <p>Time delay relay malfunction (when used)</p> <p>Level switch failure</p>	<p>Check for leaks, then fill reservoir</p> <p>Clean reservoir and level switch</p> <p>Replace time delay relay</p> <p>Replace level switch</p>
Fault light remains on	<p>Low coolant flow</p> <p>No coolant flow</p> <p>Flow switch sticking</p>	<p>See Problem; Low coolant flow</p> <p>See Problem; No coolant flow</p> <p>Disassemble flow switch, clean and reinstall, or replace</p>
Level light does not work	<p>Time delay relay has not timed out (when used)</p> <p>Lamp burned out</p> <p>Level switch failure</p>	<p>Wait for time delay relay to time out</p> <p>Replace lamp</p> <p>Replace level switch</p>
Low coolant flow	<p>Pump suction strainer clogged</p> <p>Pump rotating backwards</p> <p>Flow control valve not fully open</p>	<p>Remove strainer, clean and reinstall or replace</p> <p>Reverse one electrical phase</p> <p>Open flow control valve</p>

Problem	Possible Cause	Possible Remedy
Low coolant flow (continued)	Pressure relief valve set too low (unless not adjustable) Low coolant level in reservoir Restriction in coolant lines external to chiller Frozen evaporator Flow switch clogged	Adjust pressure relief valve to specification Fill reservoir to proper level Eliminate restrictions in coolant lines external to chiller Call Lydall Disassemble flow switch, clean and reinstall, or replace
No coolant flow	Pump not primed Pump suction strainer clogged No coolant in reservoir Pump overload tripped Pump motor shaft bound to seal Pump housing improperly torqued Damaged pump Frozen evaporator Clogged line or closed valve in external piping Leak(s) in external piping	Prime pump Remove and clean strainer, then reinstall Repair any leaks, then fill reservoir Wait 5 minutes for overload to reset Replace pump or renew seal Remove pump, torque to specifications, test, and reinstall Replace pump Call Lydall Check external piping for dirt or closed valve Repair leaks as needed
Chiller cools well below the desired Set-Point	Microprocessor programmed incorrectly Malfunctioning solenoid valve Solid State Relay failure Microprocessor failure	Reprogram microprocessor - Call Lydall Repair or replace solenoid valve Replace Solid State Relay Replace microprocessor

Problem	Possible Cause	Possible Remedy
Chiller shuts down during operation	Refrigeration high pressure cut-out set too low	Adjust and reset refrigeration high pressure cut-out
	Refrigeration low pressure cut-out set too high	Adjust and reset refrigeration low pressure cut-out
	Water modulating valve set too high	Adjust water modulating valve
	Excess refrigerant charge	Remove excess refrigerant, then charge to specifications on serial tag
	Pump overload setting too low	Adjust and reset pump thermal overload relay to specifications, or replace if faulty
	Pump overload tripped	Determine cause, if pump is damaged, repair or replace
	Low voltage	Check electrical service to chiller
Too much recirculating pressure to process	Flow control valve set too high	Throttle flow control valve
	Pressure relief valve set too high (unless not adjustable)	Adjust pressure relief valve
Compressor does not run	Compressor internal thermostat tripped	Allow time for compressor to cool and automatically reset
	Motor burned out	Replace - Call Lydall
Compressor turns on and off automatically	Discharge pressure too high	Check Facility Water for blockage
	Condenser fan(s) not on	Check motor(s) and wiring
	Refrigeration high pressure cut-out set to automatic	Check settings
Temperature display reads incorrectly	Loose wire	Disconnect power to unit, then check wiring
	Broken RTD	Replace RTD
	Microprocessor failure	Replace microprocessor

Problem	Possible Cause	Possible Remedy
Microprocessor does not work	5 second delay has not timed out	Wait at least 5 seconds after turning on
	Microprocessor programmed incorrectly	Reprogram microprocessor - Call Lydall
	Microprocessor failure	Replace microprocessor

Warranty

The Lydall Limited Warranty

Twelve-Month Warranty Parts and Labor

Lydall Industrial Thermal Solutions Inc. warrants this product to the original Owner for a period of twelve (12) months from the date of shipment. Lydall will repair, or, at its discretion, replace any part found to contain a manufacturing defect in material or workmanship, without charge to the Owner, for twelve months from date of shipment. Shipping costs are excluded from warranty. Service labor will be at no charge during the warranty period as long as the labor is supplied at the Lydall plant in Ossipee, New Hampshire, or by a Lydall approved service provider. Replacement or repaired parts will be warranted only for the un-expired portion of the original Warranty. To obtain prompt warranty service, contact Lydall, PO Box 1000, Ossipee, New Hampshire, 03864, USA.

Before returning any equipment to Lydall for repair, it is necessary to contact the Lydall Service Department for a Return Material Authorization number and an authorized service depot location where the repairs will be completed.

This Warranty does not cover the following: Damage or failure of any part caused by accident, customer shipping, storage, misuse, customer modification, fire, flood, Acts of God, or resulting from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided in the User Manual. As noted in the User Manual, any modification of the unit without expressed written consent from Lydall will void the warranty.

In no event shall Lydall be liable for any repairs or service or any consequence of any repair or service that are not performed in strict accordance with all applicable city, county, state, and federal laws.

Further limitations and exclusions: This Warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. In no event shall Lydall be liable for any consequential or incidental damages that the Owner may incur resulting from purchase or use of this Lydall product. The buyer's sole and exclusive remedy and the liability limit of Lydall, for any loss whatever, shall not exceed the purchase price paid by the purchaser for the Lydall product on which a claim is made.

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